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ENVIRONMENT

Mr. Keith M. Krawczyk
Project Coordinator
MDEQ-RRD-Superfund
Constitution Hall – 3rd Floor South
525 West Allegan Street
Lansing, Michigan 48909-7926

Subject:
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
King Highway Landfill Operable Unit 3 (KHL OU)
Work Plan for Investigating Landfill Gas Along the Western Edge of the King Highway Landfill

Date:
January 10, 2013

Contact:
Patrick McGuire

Phone:
315.671.9233

Email:
pat.mcguire@arcadis-us.com

Our ref:
B0064583.0003.00907

Dear Mr. Krawczyk:

On behalf of Georgia-Pacific LLC (Georgia-Pacific), this document has been prepared to address the detection of methane gas at concentrations above the lower explosive limit (LEL) at gas probe GW-13 and additional temporary boreholes installed along the western side of the King Highway Landfill (KHL) of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site (Site). This document is organized as follows:

1. Detection of methane along the west side of the KHL;
2. Proposed investigation of landfill gas along the western side slope; and
3. Schedule.

These items are further discussed below:

1. DETECTION OF METHANE ALONG THE WEST SIDE OF THE KHL

In response to the Michigan Department of Environmental Quality's (MDEQ's) preliminary comments (MDEQ 2011) on the June 2011 versions of the DRAFT FINAL *Report for Completion of Construction* (Completion Report; ARCADIS 2011) and DRAFT FINAL *Operation and Maintenance Plan* (O&M Plan; ARCADIS 2011) GW-13 was installed. Gas probe GW-13 was installed northwest of existing landfill gas cutoff trench, Trench A and adjacent to the site security fence along the west side of the KHL on October 26, 2011 (Figure 1). Following the installation of gas probe GW-13, methane has been detected at concentrations above the LEL each time the gas probe has been sampled, as presented in Table 1 below.

Table 1 – Methane Concentrations Detected At GW-13 and Corresponding Temporary Boreholes

Sample Location	Date	Methane Concentration (%)
GW-13	11/17/11	60.1
	02/16/12	54.9
	06/07/12	48.5
	08/23/12	51.8
	11/08/12	58.0
BH-13-01*	11/17/11	0.0
	02/16/12	0.0
	06/07/12	29.2
	08/23/12	25.6
	11/08/12	60.0
BH-13-02*	02/16/12	13.1
	06/07/12	0.3
	08/23/12	0.2
	11/08/12	0.0
BH-13-03*	02/16/12	0.0
	06/07/12	23.8
	08/23/12	44.6
	11/08/12	20.8
BH-13-04*	06/07/12	0.2
	08/23/12	0.1
	11/08/12	0.0
BH-13-05*	06/07/12	14.1
	08/23/12	9.0
	11/08/12	0.0
BH-13-06*	06/07/12	0.5
	08/23/12	0.2
BH-13-07*	06/07/12	0.3
	08/23/12	0.2
BH-13-08*	06/07/12	0.3
	08/23/12	0.1

* Note that temporary boreholes BH-13-01 through BH-13-08 were installed at approximately the same location for the June and August 2012 monitoring events. Temporary boreholes BH-13-01 through BH-13-05 were installed at difference locations for the monitoring events prior to, and following the June and August 2012 monitoring events (i.e., November 2011, February 2012, and November 2012 monitoring events).

The elevated concentrations detected at gas probe GW-13 during these last five quarterly events required temporary boreholes (BH-13-01 through BH-13-08) to be installed to the north and west of GW-13 to delineate the extent of methane above the LEL. The monitoring results associated with the temporary borehole locations are shown on Figure 1, and the table above.

2. PROPOSED INVESTIGATION OF LANDFILL GAS ALONG THE WESTERN SIDE OF THE KHL

Based on the results of gas monitoring performed along the length of the western side slope between gas probe GW-13 and the fenceline to the west, it appears likely that the gas is expressed to the atmosphere some distance upgradient from the side slope toe (i.e., upslope from the western fence line). As opposed to the subsurface migration of gas beyond the toe of the western side slope and then venting, it appears more likely that gas would migrate outward (horizontally) from the landfill only to a limited extent at which point the gas would intersect the ground surface of the western side slope and then be expressed to the atmosphere. It is noted that the western side slope extends south beyond the northern limit of the Trench A, to the northwest corner of the landfill.

Therefore, Georgia-Pacific is proposing to investigate the expression of landfill gas along the west side slope by installing temporary boreholes starting at the northern end of Trench A and extending northwest to the property boundary. The temporary boreholes will be installed at approximately 40-foot intervals along the western side slope (Figure 2). At each interval location, a minimum of three temporary boreholes will be installed to transect the sideslope, beginning near the apex of the sideslope and progressing downhill toward the property boundary (Figure 3). Each temporary borehole will be installed to a minimum depth of approximately 4.5 feet, with landfill gas concentrations being measured at approximately the 1.5-foot, 3.0-foot, and 4.5-foot depth interval. If methane gas is still detected at the 4.5-foot depth interval, the temporary borehole will be advanced further until the extent of methane above the LEL has been delineated, with caution being taken not to interfere with or compromise the sanitary sewer line. Similarly, if methane gas is detected at the temporary borehole nearest the property boundary, supplementary temporary borehole(s) may be advanced to delineate the extent of methane gas toward the bottom of the sideslope.

The results of the landfill gas monitoring will provide additional information regarding the expression of methane along the western side slope; and provide a better understanding of the type and location of engineering controls that may be necessary to mitigate the migration of methane gas along this portion of the KHL.

3. SCHEDULE

Following MDEQ approval of this work plan, it is anticipated that landfill gas investigation activities will be performed in the spring of 2013 (i.e., concurrently with the 2013 2nd quarter landfill gas monitoring activities), as weather conditions will be

more conducive to landfill gas generation. The results of the investigation will be evaluated to determine where landfill gas is being expressed from the KHL and whether additional engineering controls are necessary. A report documenting the monitoring results and the type and location of engineering controls to be installed (if determined to be necessary based on the investigation), will be submitted to MDEQ within 30 days following completion of the investigation.

If you have any questions, please do not hesitate to contact me.

Sincerely,

ARCADIS

Patrick McGuire
Principal Environmental Engineer

Copies:
Daria Devantier, MDEQ
Judith Alfano, MDEQ
Michael Berkoff, USEPA Region 5
Garry Griffith, P.E., Georgia-Pacific
Dawn Penniman, P.E., ARCADIS

Enclosures:

Figure 1	Detection of Landfill Gas Along the West Side of the Landfill
Figure 2	Landfill Gas Sampling Plan Along the West Side Slope
Figure 3	Cross-Section A-A'

4. References

ARCADIS. 2011a. Draft Final – *Operation and Maintenance Plan.* King Highway Landfill Operable Unit 3. June 2011.

ARCADIS. 2011b. Draft Final – *Report for Completion of Construction.* King Highway Landfill Operable Unit 3. June 2011.

MDEQ. 2011. E-mail from MDEQ to ARCADIS Regarding Draft Comments on the Completion Report and O&M Plan. September 19, 2011.

CITY OF KALAMAZOO PROPERTY

MW-16A

MW-16B

MW-11RR

BH-13-08

BH-13-07

BH-13-05

BH-13-06

APPROXIMATE LOCATION OF KALAMAZOO METAL RECYCLERS WALL AND EDGE OF CONCRETE

BH-13-03

BH-13-02

BH-13-04

BH-13-01

BH-13-02

KALAMAZOO METAL RECYCLERS PROPERTY

V-4-1

GW-11

TRENCH A – 2-FOOT WIDE, 6-FOOT DEEP, 100-FOOT LONG

TRENCH B – 2-FOOT WIDE, 10-FOOT DEEP, 150-FOOT LONG

BH-13-03

GW-13

BH-13-01

GW-4

V-4-2

V-4-3

760 765 770 775 780 785

INSET

BH-13-03

BH-13-04

GW-13

BH-13-01

BH-13-01

BH-13-02

LEGEND:

- APPROXIMATE CITY OF KALAMAZOO PROPERTY BOUNDARY
- APPROXIMATE KING HIGHWAY LANDFILL PROPERTY BOUNDARY
- ABANDONED RAILROAD
- SHEETPILE WALL
- RIPRAP
- FINAL AS-BUILT INDEX CONTOUR
- FINAL AS-BUILT INTERMEDIATE CONTOUR
- SECURITY FENCE
- 18" DIAMETER SANITARY SEWER LINE
- 24" DIAMETER SANITARY SEWER LINE
- 72" DIAMETER SANITARY SEWER LINE
- SANITARY MANHOLE
- PORE WATER COLLECTION PIPE
- APPROXIMATE WATER EDGE
- MW-16A — MONITORING WELL
- BH-13-02 — TEMPORARY BOREHOLE LOCATION (SEE NOTE 9)
- BH-13-01 — TEMPORARY BOREHOLE LOCATION WHERE METHANE WAS DETECTED ABOVE THE LEL (SEE NOTE 9)
- GW-4 — GAS MONITORING PROBES WHERE METHANE WAS DETECTED ABOVE THE LEL
- GW-11 — GAS MONITORING PROBE
- V-4-2 — GAS VENTS
- EXISTING LANDFILL GAS CUTOFF TRENCH
- APPROXIMATE LIMITS OF WASTE

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY RMT, INC., ANN ARBOR, MICHIGAN (CADD FILE: L1630SU01.DWG AS-BUILT SURVEY; 8/21/00).
2. FINAL AS-BUILT CONTOUR ELEVATIONS ARE SHOWN AND ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC., DATED 9/27/00 WITH REVISIONS DATED 10/23/00, 12/21/01, 12/10/02, AND 7/24/03.
3. FINAL AS-BUILT CONTOUR ELEVATIONS OF SEDIMENTATION BASIN ARE BASED ON A FIELD SURVEY BY PREIN-NEWHOF, DATED 2/3/04.
4. ELEVATIONS ARE BASED ON NGVD OF 1929 (MSL).
5. PROPERTY SURVEY PERFORMED BY WILKINS & WHEATON ENGINEERING CO., INC., ON 7/1/96.
6. TOPOGRAPHIC CONTOUR INTERVAL IS 1 FOOT.
7. LOCATION OF GW-11 IS BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 1/11/06.
8. LOCATION OF GW-13 IS BASED ON A FIELD SURVEY CONDUCTED BY PREIN & NEWHOF ON 11/1/2011.
9. TEMPORARY BOREHOLES BH-13-01 THROUGH BH-13-08 WERE INSTALLED AT APPROXIMATELY THE SAME LOCATION FOR THE JUNE AND AUGUST 2012 MONITORING EVENTS. TEMPORARY BOREHOLES BH-13-01 THROUGH BH-13-05 WERE INSTALLED AT DIFFERENT LOCATIONS FOR THE MONITORING EVENTS PRIOR TO, AND FOLLOWING THE JUNE AND AUGUST 2012 MONITORING EVENTS (I.E., NOVEMBER 2011, FEBRUARY 2012, AND NOVEMBER 2012 MONITORING EVENTS).

0 80' 160'

GRAPHIC SCALE

ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE

WORK PLAN FOR INVESTIGATING LANDFILL GAS ALONG THE WESTERN EDGE OF THE KING HIGHWAY LANDFILL

DETECTION OF LANDFILL GAS ALONG THE WEST SIDE OF THE LANDFILL

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FIGURE 1

CITY: SYRACUSE-NY GROUP: ENV/CAD DB: L. POSENAUER L. FORAKER PIC: C. CHEATHAM PM: D. PENNIMAN TM: D. PENNIMAN LYR: ON=*;OFF=*REF*
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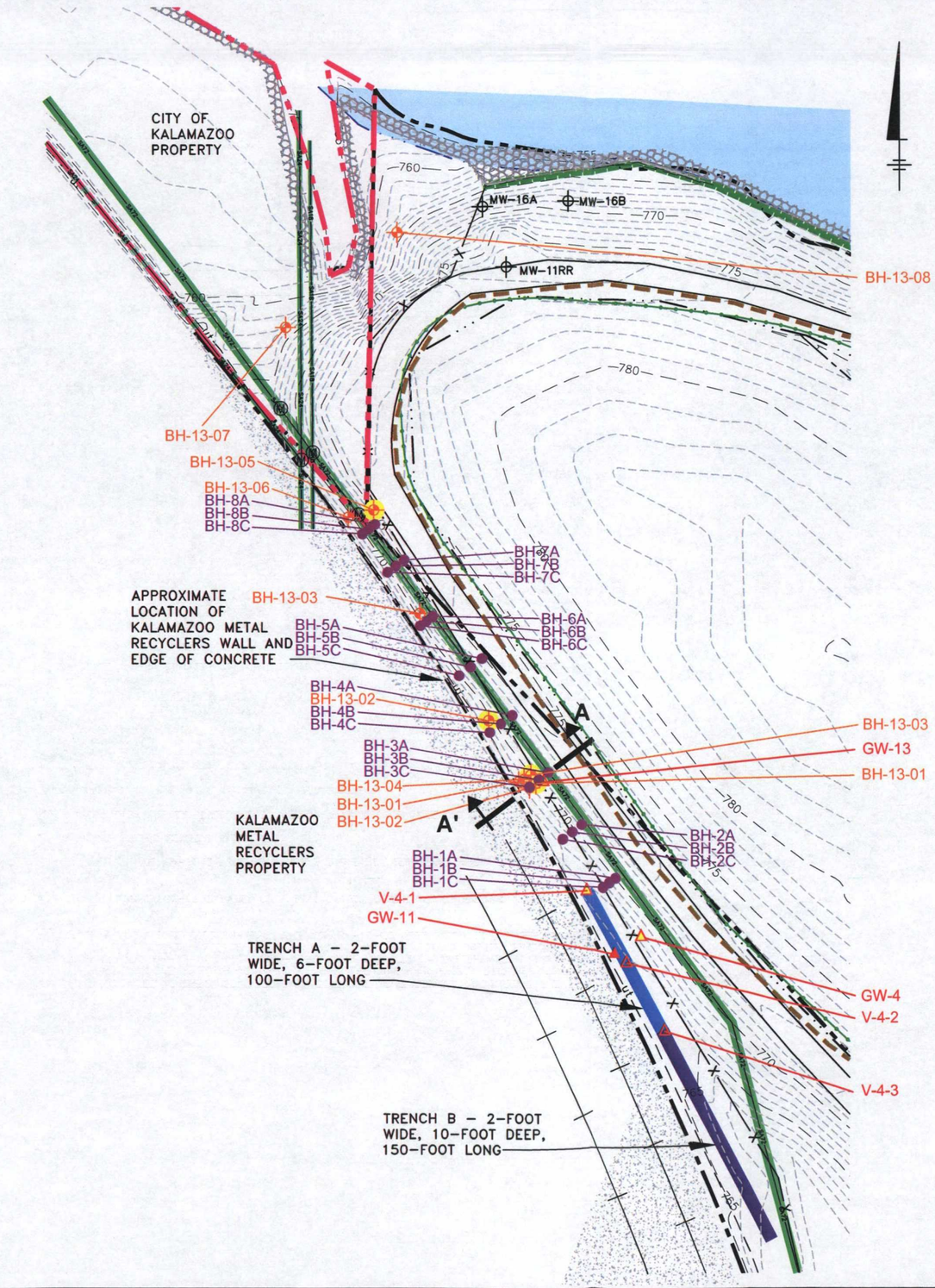

LEGEND:

- APPROXIMATE CITY OF KALAMAZOO PROPERTY BOUNDARY
- APPROXIMATE KING HIGHWAY LANDFILL PROPERTY BOUNDARY
- ABANDONED RAILROAD
- SHEETPILE WALL
- RIPRAP
- FINAL AS–BUILT INDEX CONTOUR
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- BH-13-02 — TEMPORARY BOREHOLE LOCATION (SEE NOTE 9)
- BH-13-01 — TEMPORARY BOREHOLE LOCATION WHERE METHANE WAS DETECTED ABOVE THE LEL (SEE NOTE 9)
- GW-4 — GAS MONITORING PROBES WHERE METHANE WAS DETECTED ABOVE THE LEL
- GW-11 — GAS MONITORING PROBE
- V-4-2 — GAS VENTS
- BH-1A — PROPOSED TEMPORARY BOREHOLE SAMPLING LOCATION
- EXISTING LANDFILL GAS CUTOFF TRENCH
- APPROXIMATE LIMITS OF WASTE

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY RMT, INC., ANN ARBOR, MICHIGAN (CADD FILE: L1630SU01.DWG AS–BUILT SURVEY; 8/21/00).
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0 80' 160'

GRAPHIC SCALE

ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE

WORK PLAN FOR INVESTIGATING LANDFILL GAS ALONG THE WESTERN EDGE OF THE KING HIGHWAY LANDFILL

LANDFILL GAS SAMPLING PLAN ALONG THE WEST SIDE SLOPE

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FIGURE 2

CITY: SYRACUSE-NY GROUP: ENVCAD DB: L. POSENAUER, L. FORAKER PIC: C. CHEATHAM PM: D. PENNIMAN TM: D. PENNIMAN LYR: ON="OFF=REF"
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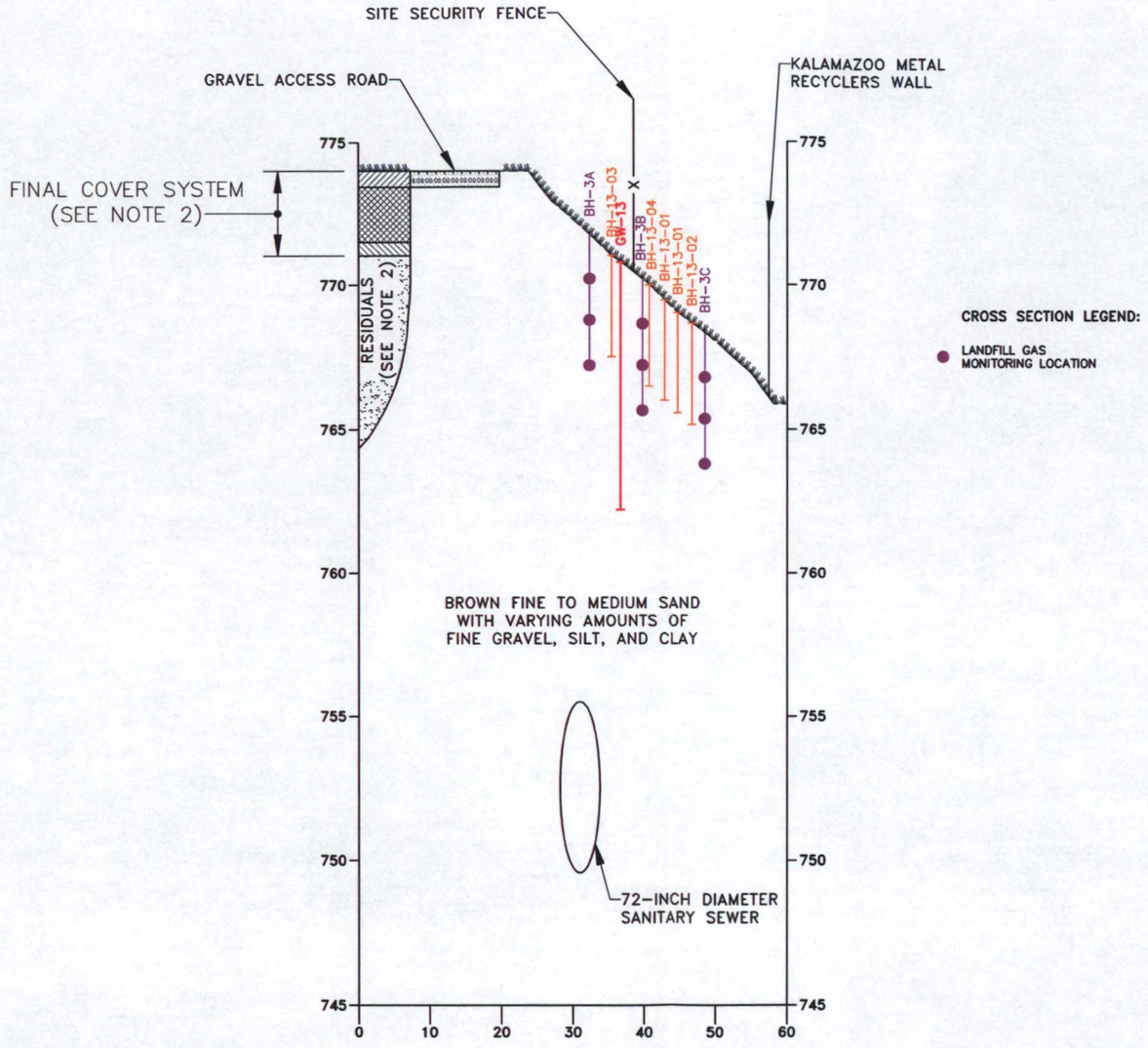

CROSS SECTION A-A'

CROSS SECTION NOTES:

1. CROSS SECTION IS EXAGGERATED HORIZONTALLY 4 TIMES AND VERTICALLY 16 TIMES FOR CLARITY.
2. THE LOCATION AND DEPTH OF THE FINAL COVER SYSTEM AND RESIDUALS IS APPROXIMATE AND HAS BEEN SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.

0 20' 40'
HORIZONTAL GRAPHIC SCALE

0 5' 10'
VERTICAL GRAPHIC SCALE

ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
WORK PLAN FOR INVESTIGATING LANDFILL GAS ALONG THE WESTERN EDGE OF THE KING HIGHWAY LANDFILL

CROSS-SECTION A-A'

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FIGURE
3